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IS 2385 (1977): Hot-Rolled Mild Steel Sheet and Strip in Coil Form for Cold-Reduced Tinplate and Cold-Reduced Blackplate [MTD 4: Wrought Steel Products]



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“Knowledge is such a treasure which cannot be stolen”

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IS : 2385 - 1977

Indian Standard

**SPECIFICATION FOR HOT-ROLLED MILD STEEL
SHEET AND STRIP IN COIL FORM FOR
COLD-REDUCED TINPLATE AND
COLD-REDUCED BLACKPLATE**

(First Revision)

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**INDIAN STANDARDS INSTITUTION
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002**

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Indian Standard

SPECIFICATION FOR HOT-ROLLED MILD STEEL SHEET AND STRIP IN COIL FORM FOR COLD-REDUCED TINPLATE AND COLD-REDUCED BLACKPLATE

(*First Revision*)

Wrought Steel Products Sectional Committee, SMDC 5

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Indian Standard

SPECIFICATION FOR HOT-ROLLED MILD STEEL SHEET AND STRIP IN COIL FORM FOR COLD-REDUCED TINPLATE AND COLD-REDUCED BLACKPLATE

(*First Revision*)

0. FOREWORD

0.1 This Indian Standard (First Revision) was adopted by the Indian Standards Institution on 2 June 1977, after the draft finalized by the Wrought Steel Products Sectional Committee had been approved by the Structural and Metals Division Council.

0.2 This standard was first issued in 1965 in order to cater the raw material requirements to the products conforming to IS : 1993-1962*. In view of the experience gained during these years it has been decided to revise this standard covering the requirements for steel sheets for cold-reduced tinplate and cold-reduced blackplate.

0.3 For the benefit of the purchaser, an informative appendix (see Appendix A) has been included giving particulars to be specified by the purchaser while ordering material to this standard.

0.4 This standard contains clauses 4.1.1 and 8.2 which call for agreement between the purchaser and the supplier.

0.5 While preparing this revision, assistance has been derived from ISO/DIS 3576 'Hot-rolled carbon steel sheet coils for the production of cold-reduced products', issued by the International Organization for Standardization.

0.6 For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS : 2-1960†. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

*Specification for cold-reduced tinplate and cold-reduced blackplate.

†Rules for rounding off numerical values (revised).

1. SCOPE

1.1 This standard covers the requirements for hot rolled mild steel sheets and strips in coil form for production of cold reduced tinplate and cold-reduced blackplate.

1.2 Material conforming to this standard shall be supplied in coil form, commonly in the range of thickness 1.8 mm and thicker and in widths 600 mm and over. The scale or oxide shall be removed by the manufacturer, purchaser or reroller prior to cold-reduction. Surface is of considerable importance because of the variety of finishes and other characteristics required in the final cold-reduced product.

1.3 When the end product is to have special characteristics, the specifications of the hot-rolled sheet/strip shall be agreed upon between the manufacturer and reroller at the time of ordering.

1.4 Widths less than 600 mm may be slit from wide coils and shall be considered sheet/strips coils for rerolling.

2. TERMINOLOGY

2.0 For the purpose of this standard, the following definitions, and those given in IS : 1956 (Part IV)-1975* shall apply.

2.1 Hot-Rolled Steel Sheet/Strip — A product obtained by rolling heated steel through a continuous-type or reversing-type strip mill to the required sheet thickness. The product has a surface covered with oxide or scale resulting from the hot-rolling operation.

2.2 Hot-Rolled Descaled Steel Sheet/Strip — Hot-rolled steel sheet/strip from which oxide or scale has been removed, commonly by pickling in an acid solution. Descaling may also be performed by mechanical means, such as grit blasting. Oxide or scale on hot-rolled steel is subject to variations in thickness, adherence and colour. Removal of the oxide or scale may disclose surface imperfections not readily visible prior to this operation. As a deterrent to rusting, a coating of oil is usually applied to hot-rolled descaled sheet/strip. It may be necessary for the reroller to ensure that this oil is compatible with subsequent processing.

2.3 Mill Edge — A normal side edge produced in hot-rolling. Mill edges may contain some irregularities, such as cracked or torn edges or thin (feathered) edges.

2.4 Edge Trimmed — A normal edge obtained by shearing, slitting or trimming a mill edge product. In higher carbon steel, the cut edge may crack more readily during cold reduction, and an annealing operation may have to be included in the processing prior to cold-reduction.

*Glossary of terms relating to iron and steel : Part IV Steel sheet and strip.

3. SUPPLY OF MATERIAL

3.1 General requirements relating to supply of hot-rolled mild steel sheet and strip for production of cold-reduced tinplate and blackplate shall conform to IS : 1387-1967*.

4. MANUFACTURE

4.1 Steel shall be manufactured by the open-hearth, electric, duplex, basic-oxygen or a combination of these processes. In case any other process is employed by the manufacturer, prior approval of the purchaser should be obtained.

4.1.1 Steel may be of killed, semi-killed or rimming quality as agreed to between the purchaser and the supplier.

4.2 Finishing and coiling temperatures shall be adjusted by the manufacturer to yield uniform grains and controlled precipitation and distribution of carbides and nitrides so that the strips may be further processed to obtain the desired physical properties.

5. CHEMICAL COMPOSITION

5.1 The ladle analysis of the material when analyzed in accordance with the appropriate part of IS : 228† shall be as given in Table 1.

TABLE 1 CHEMICAL COMPOSITION

(Clauses 5.1 and 5.2)

CONSTITUENT	PERCENT, <i>Max</i>
Carbon	0.12
Manganese	0.60
Sulphur	0.050
Phosphorus	0.050

NOTE 1 — When basic oxygen process is employed in manufacture, nitrogen content shall be limited to 0.007 percent, *Max* for deep drawing and extra deep drawing.

NOTE 2 — When the steel is aluminium killed, nitrogen content shall be limited to 0.010 percent, *Max* and aluminium content shall be 0.02 to 0.08 percent.

NOTE 3 — Limits of elements specified above may be altered subject to mutual agreement between the manufacturer and the purchaser. Limits for other elements like copper, silicon, and chromium may also be specified; if so required.

*General requirements for the supply of metallurgical materials (*first revision*).

†Methods of chemical analysis of steels (*second revision*). (Being issued in parts).

IS : 2385 - 1977

5.2 Product Analysis — The permissible variation in the case of product analysis from the limits specified in Table 1 shall be as follows:

<i>Constituent</i>	<i>Permissible Variation Over the Specified Limit, Percent, Max</i>
Carbon	+ 0.02
Manganese	+ 0.03
Sulphur	+ 0.005
Phosphorus	+ 0.005

NOTE — Check analysis shall not apply in case of rimming quality steel.

6. FREEDOM FROM DEFECTS

6.1 The sheets and strips shall be reasonably free from laminations, seams, cracks, rolled-in oxides, inclusions and other harmful defects which may affect the material in further processing.

6.2 Sheet and strip edges shall be reasonably free from defects like cracks, laminations, etc, which shall disappear on normal side trimming. When sheets and strips are supplied after side trimming, the edges shall be free from all defects.

6.3 The surface of the sheets and strips, when supplied in hot-rolled condition, shall be free from oil, grease, scale and such other foreign materials which cannot be removed by normal pickling methods.

6.4 The surface of the sheets and strips, when supplied in pickled condition, shall be free from scales, rolling marks, deep pores, etc, which might appear as defects after cold reduction.

7. DELIVERY

7.1 Sheets and strips shall be supplied in any one of the following two conditions:

- a) Hot-rolled, or
- b) Hot-rolled, pickled and oiled.

8. TOLERANCES

8.1 The rolling and cutting tolerances for hot rolled mild steel sheets and strips shall conform to IS : 1852-1973*.

8.2 Because of the variety of manufacturers and purchasers facilities, the limitations on the masses of coils shall be the subject of an agreement between the manufacturer and the purchaser.

*Specification for rolling and cutting tolerances for hot rolled steel products (*second revision*).

9. PACKING

9.1 Sheets and strips shall be coiled tight with the edges one above the other. Projecting out (or telescoping) of the edges shall not exceed five percent of the width of the sheet or strip. For sheets and strips of width above 800 mm, a maximum projection of 40 mm shall be allowed. Projection out of edges shall not be permitted on both sides of the coils.

9.1.1 Coils shall be rigidly packed by means of high tensile steel strappings, tied around the circumference and crosswise of each coil. Care shall be taken not to damage the coil during loading, transport and storage.

10. MARKING

10.1 Each coil of sheet or strip shall be legibly marked on the coil or on an attached tag with the following:

- a) Manufacturer's name or trade-mark,
- b) Coil number,
- c) Coil mass,
- d) Product dimensions, and
- e) Order number.

10.1.1 The material may also be marked with the ISI Certification Mark.

NOTE — The use of the ISI Certification Mark is governed by the provisions of the Indian Standards Institution (Certification Marks) Act and the Rules and Regulations made thereunder. The ISI Mark on products covered by an Indian Standard conveys the assurance that they have been produced to comply with the requirements of that standard under a well-defined system of inspection, testing and quality control which is devised and supervised by ISI and operated by the producer. ISI marked products are also continuously checked by ISI for conformity to that standard as a further safeguard. Details of conditions under which a licence for the use of the ISI Certification Mark may be granted to manufacturers or processors, may be obtained from the Indian Standards Institution.

APPENDIX A
(Clause 0.3)

A-1. While placing an order for the material covered by this standard, the purchaser should specify clearly the following:

- a) Number of this Indian Standard;
- b) Name of the material;
- c) Dimensions of the product and the quality required;
- d) Chemical composition;
- e) Condition of delivery;
- f) Type of edge (mill edge or edge trimmed);
- g) A report of cast analysis, if required;
- h) Inspection prior to shipment from the manufacturer's works, if required;
- j) Any special requirement, if required.

AMENDMENT NO. 1 DECEMBER 1989
TO
IS : 2385 - 1977 SPECIFICATION FOR
HOT-ROLLED MILD STEEL SHEET AND STRIP
IN COIL FORM FOR COLD-REDUCED TINPLATE
AND COLD-REDUCED BLACKPLATE

(First Revision)

(Page 5, clause 5.1) — Substitute the following for the existing clause:

'5.1 The ladle analysis of the material, when carried out either in accordance with appropriate parts of IS : 228 or any other established instrumental/chemical method shall be as given in Table 1. In case of dispute, the procedure given in appropriate parts of IS : 228 shall be the referee method.'

(Page 5, Table 1, col2, last entry) — Substitute '0.020' for '0.050'.
(SMD05)

INDIAN STANDARDS
ON
SHEET AND STRIP

IS:

- 277-1969 Galvanized steel sheets (plain and corrugated) (*second revision*)
 412-1975 Expanded metal steel sheets for general purposes (*second revision*)
 513-1973 Cold rolled carbon steel sheets (*first revision*)
 648-1970 Non-oriented electrical steel sheets for magnetic circuits (*second revision*)
 1029-1970 Hot rolled steel strips (baling) (*first revision*)
 1079-1973 Hot rolled carbon steel sheet and strip (*third revision*)
 2507-1975 Cold rolled steel strips for springs (*first revision*)
 3024-1965 Electrical steel sheets (oriented)
 4030-1973 Cold rolled carbon steel strip for general engineering purposes (*first revision*)
 5272-1969 Carbon steel sheets for integral coaches
 5872-1973 Cold rolled steel strips (box strappings) (*first revision*)
 6240-1976 Hot rolled steel plate (up to 6 mm), sheet and strip for the manufacture of low pressure gas cylinders (*first revision*)
 7226-1974 Cold rolled medium, high carbon and low alloy steel strip for general engineering purposes

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